

(6)

Chief with closed eyes. I accordingly, to all appearances, obeyed. The Chief waved his open hands in front of my eyes at the same time muttering in a low voice some strange-sounding words, then assured me that all was well. I was able to watch his movements as I did not quite close my eyes. Ledju is also supposed to possess other extraordinary powers besides those of a rainmaker. He showed me an iron rod (Sketch 3) about 3 feet long and about 1 inch in diameter with a kind of hollow iron bulb at each end and containing bits of stone. This particular implement is used to induce women to bring forth large families, the *modus operandi* being for the husband to bring the would-be mother to Ledju, who, grasping the iron rod in the centre with the right hand, shakes it over and around the woman, rattling the stones in the bulbs at the ends of the rod, at the same time muttering some strange incantation.

F. SPIRE.


Journal of the African Society.

 13 FEB 1906 No. xvii , Oct. , 1905.

THE ARROW-POISONS OF NORTHERN NIGERIA

By Louis W. La Cihard.

NORTHERN NIGERIA is one of those countries of the Dark Continent whose remote interior has never yet been thoroughly explored. At present, the administrator, the surveyor and engineer are all busily engaged in pushing forward, as pioneers of civilisation, and very little has been done by the man of science. Little is known of the flora and fauna of the country, though these are somewhat similar to those of West Africa as a whole. But the entomologist and botanist have yet to name and classify many distinct species at present not known in scientific records, and a very wide and comprehensive field is open to study. One of the most interesting and perhaps useful of these studies is the examination and analysis of the various poisons used by the Hausas throughout Northern Nigeria to tip their deadly arrows preparatory to a "palaver." It seems rather strange that a study of these toxic substances has not yet been made; for several white men have already lost their lives in encounters with natives armed with these poisoned arrows. So far as I have been able to ascertain, no definite information has hitherto been gathered regarding the composition of these poisons, and consequently, no effective antidote has been discovered. In here recording the results of investigations and experiments made during the last few months I hope I may succeed in contributing, however slightly, to the present knowledge on the subject.

There are two distinct poisons employed by the natives—vegetable and animal. I was fortunate enough to secure seven different specimens of the vegetable poison from various parts of the Protectorate, and accompanying five of these specimens, were the leaves or the roots of the plants from

which they were obtained. I also received three separate specimens of the virulent matter extracted from decaying animal tissue, which is smeared over the already poisoned arrows to render them more highly toxic. The specimens of the vegetable poison which is known to the Hausas under the generic name of "deffi," arrived in small wooden calabashes with narrow necks, and I transferred them to stoppered bottles and labelled them together with the botanical specimens and the animal virus.

(a) *Vegetable Poisons* :—These presented a similar appearance though two specimens were darker than the rest. Generally speaking, they consisted of an odourless light brown, thick, syrupy fluid with a distinct layer of clear colourless fluid on top. When exposed to the air for a few hours, each specimen turned black and hard and could be scraped with a knife, resembling in every outward particular, the same substance that I had previously scraped off poisoned arrows. Like the latter substance, it was perfectly soluble in chloroform, ether and alcohol, but insoluble (or partially so) in water and the dilute acids. I then performed the following experiments :—

(a) 3 c.cs.¹ of a strong solution of this hard solid substance in alcohol were injected into a monkey weighing seven pounds. The animal died within twelve minutes with the usual symptoms of blood-poisoning.

(b) 3 c.cs. of a semi-normal solution of the colourless fluid on top of the original poison was injected into a small dog weighing 9lb. Death followed within seven minutes with the same symptoms as before.

(c) A small quantity of the original poison was taken and thoroughly washed and filtered twice, thus getting rid of all soluble matter. The brown filtrate was taken and dissolved in alcohol. 3 c.cs. of the latter solution were injected into a small dog weighing 10·5lbs. During the first thirty minutes, the animal was in a comatose state, during the next forty-five minutes, it appeared normal, but after this, it gradually grew weaker and expired within two hours of the operation with symptoms of narcotic blood-poisoning.

¹ Cubic centimetres.

I made similar experiments upon small animals such as frogs and lizards; and generally, though not always, the results corresponded with those above. I therefore draw the conclusion that the bulk of the active poison is contained in the soluble matter dissolved in the clear fluid present on top of the insoluble brown matter. The latter is poisonous also, but the extremely rapid-acting deadly action of the poisoned arrows is due, in my opinion, to the former. I now made several chemical experiments upon the fluids, and found that when Tannic acid was added to the clear solution, a flocculent brown precipitate was produced. Potassium permanganate solution was not deprived of its colour and had no visible chemical effect whatever. Upon the addition of Acetic acid, however, a dirty brown heavy precipitate was thrown down, and the acetates and vinegar had an almost similar action. The nitrites ($K\ NO_2$ and $Na\ NO_2$) appear to have a slight effect, causing a light precipitate. I cannot explain the action further than this, since I was unable to make a complete chemical analysis owing to lack of apparatus and reagents. I tested the clear solution for ammonia, but found only a few traces. It was strongly alkaline, indeed somewhat active when placed in contact with paper and wool. I am strongly of opinion that a highly-poisonous soluble alkaloid is present in this clear fluid and that it is this which forms the active principle of the whole poison.

Subsequent experiments upon small animals proved that tannic and acetic acid are both very effective in preventing the rapid action of the poison. I do not doubt that the deadly action of a small quantity of the arrow poison upon a healthy man could be prevented if either of these acids were instantly applied to the wound. Powerful oxidising agents, such as Potassium Permanganate for example, do not appear to have the slightest counter-effect upon the action of these purely vegetable poisons, and this, of course, is perfectly clear upon a casual examination of the poisons themselves.

I went out into the "bush" several times with a Hausa hunter, skilled in the preparation of these poisons, to secure living specimens of the plants used. I collected about eighteen kinds, the Hausa names being as follows:—

Zabun Deffi, a plant belonging to the aloe family.

Gwazan Kwadi.

Mus Ran Nagewa.

Koffi Fogo.

Rogun Daje.

Talonia.

Kotainya Rafi.

Alacoma Tururuwa.

Kiria.

Basa.

Yato.

Tawoska.

Kabun Kwura.

Tefa Shia.

Kwokua (a plant belonging to the strychnine-producing family).

Aia Aia.

Tururibe.

Many of these specimens were the same as the dried ones I had received from Sokoto, Kano and the Lake Tchad district, but others were different. The *Strophanthus* plant was present in all of them, in the form of brown seeds. Specimens of the poison transmitted for analysis to England some time ago were said to contain *Akokanthera*, but I failed to trace any of this in the specimens which I received; neither was there anything to account for its presence in any of the botanical specimens received or collected. The following tests show that the base of the poison is *Strophanthus* rather than *Akokanthera*.

Reagent.	Action upon		Poisons under examination.
	<i>Strophanthus</i> .	<i>Akokanthera</i> .	
Conc. sulphuric acid.	Deep green.	Yellow-brown to grey.	Darkish-green.
Dilute " "	Green to blue and brown.	Yellow to brown.	Reddish-yellow.
" hydrochloric ..	Greenish-yellow to green.	Pale yellow to light brown.	Reddish-yellow to orange-yellow and dark green.

(β) *Animal Poisons.* The three specimens of animal poisons which I received differed considerably. One was of a dark reddish colour and was comparatively clear, another was a brown thick fluid literally alive with large white maggots, and the third was a slightly yellow almost clear fluid also containing a few white maggots. In all three the odour was extremely repellent and contained evidence of the presence of ammonia in considerable quantities. Two of the specimens when examined under the microscope revealed the presence of numerous crystalline bodies, due probably to the ammoniacal fermentation of some of the animal fluids. Examined under the high-power, large numbers of ciliated rod-shaped bacilli were seen, as well as large irregular mobile masses embedded in a gelatinous matrix. I obtained the following information from natives, and the Hausa hunter already mentioned. Prior to a "big palaver," the arrows are dipped first into the vegetable poison and allowed to dry, then they are smeared with this animal virus. This latter is made in various ways, but generally by mixing portions of the entrails of a dead monkey, heads of snakes, quantities of menstrual fluid, pus emanating from ulcers and guinea-worm sores and other *materies morbi*. A chemical analysis revealed clearly the presence of ammonia in large quantities, but I was unable to test for Nitrites and Nitrates, though these must necessarily have been present, of course. Chlorides were present, a flocculent white precipitate insoluble in Nitric Acid being thrown down. I made several experiments on small animals, with the fluid, though none were entirely satisfactory, death not ensuing at all. I injected some into a dog with better results, for the animal died within two hours apparently in great agony, and with every symptom of ptomaine poisoning. Whether the virus leads to a mechanical mycosis and obstruction of the vessels, or whether, more probably, it acts by modifying the physiological processes by secreting or excreting ptomaines as a result of the growth and multiplication of the living organisms present, and which in their turn, diffuse and act as poisons, I cannot say definitely. But I am of opinion that the virus, if brought into prolonged contact with *Strophanthus* or *Euphorbia* in the

presence of the air, loses much of its action upon living animal tissue, though I have not yet had the opportunity of conclusively proving this. The natives themselves assert that the vegetable poison alone, if used upon arrows, is insufficient to kill a man, although it causes death in the smaller animals rapidly. They invariably coat the arrows with the animal fluid after the vegetable poison has dried, before they start out for a "palaver." I am of opinion that *either* of the poisons, animal or vegetable, would be sufficient to cause death. One of the main features of the action of the poison, however, is the rapidity with which death ensues after a man has been shot. Fifteen or twenty minutes is the usual time which elapses. This is undoubtedly due to the *strophanthus* present and not to the *materies morbi* of the animal virus, the latter of which, in my opinion, takes some hours to spread throughout the system.

I have experienced some difficulty in obtaining correct inferences from observations I have made, in experimenting for a local antidote for the animal poison. I have been unable, as yet, to secure the necessary animals for this purpose, as small ones, such as lizards, frogs and others, are of little use, and nothing definite can be recorded either of the immediate effects of the poison or of the results of it upon the tissues and vessels, as revealed by a post-mortem examination. Potassium Permanganate and other substances which act as oxidising agents, would undoubtedly have the best effect, according to general toxicological investigation, but I hope to fully enter into this research later, and by means of a large number of experiments, to ascertain whether the rapid deadly action of an arrow poisoned by the vegetable and animal matter, is due to one or both of the latter.

L. W. LA CHARD.

THE COLONIZATION OF BRITISH EAST AFRICA

EQUATORIAL EAST AFRICA had been British for some years before we were in a position to take stock of its peculiar value to the Empire. The arguments principally urged in favour of a British Protectorate over these regions, and later on, for the building of a railway through them, were in turn philanthropic, strategic, and commercial. To guard against the continuance or recurrence of the Slave Trade and to prevent the political and commercial domination of Germany, it was necessary to administer the fertile coast belt, with Mombasa as its principal port, still forming part of the Sultanate of Zanzibar. Nearly eight hundred miles distant from the East Coast was the interesting and enlightened Kingdom of Uganda, which in the 'Seventies of the last century had already become a field for missionary enterprise. When, in the next decade, all access to this kingdom from the north was closed by the revolt of the Mahdi in the Egyptian Sudan, the only practicable road to it lay through the lands of the Masai and the scarcely explored wilderness of inner East Africa.

The aggressive power of the dreaded Masai evaporated. The waterless bush country known as the Taru Desert—a dreary, leafless forest of thorny acacias and tangled scrub, lying behind the coast belt—was traversed by the Uganda Railway. Philanthropy, and far-sighted considerations of strategy and commerce, relying on the future for their reward, had thus far overcome the reluctance of the British tax-payer to part with several millions of pounds. As the cost of railway-construction, then something of a novelty in tropical Africa, began to exceed the estimates sanctioned by Par-